A histone demethylase is necessary for regeneration in zebrafish.

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Authors: Scott Stewart, Zhi-Yang Tsun, Juan Carlos Izpisua Belmonte

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Public Summary:
Urodele amphibians and teleost fish regenerate amputated body parts via a process called epimorphic regeneration. A hallmark of this phenomenon is the reactivation of silenced developmental regulatory genes that previously functioned during embryonic patterning. We demonstrate that histone modifications silence promoters of numerous genes involved in zebrafish caudal fin regeneration. Silenced developmental regulatory genes contain bivalent me(3)K4/me(3)K27 H3 histone modifications created by the concerted action of Polycomb (PcG) and Trithorax histone methyltransferases. During regeneration, this silent, bivalent chromatin is converted to an active state by loss of repressive me(3)K27 H3 modifications, occurring at numerous genes that appear to function during regeneration. Loss-of-function studies demonstrate a requirement for a me(3)K27 H3 demethylase during fin regeneration. These results indicate that histone modifications at discreet genomic positions may serve as a crucial regulatory event in the initiation of fin regeneration.

Scientific Abstract:
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